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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,554	12/27/2000	Ayako Hohsaka	HOHSAKA-2	2522

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07/06/2005

Browdy & Neimark  
624 Ninth Street NW  
Washington, DC 20001-5303

EXAMINER
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ANGEBRANNDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 07/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/720,554

Applicant(s)

HOHSAKA ET AL.

Examiner

Martin J. Angebrannt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/8/05 & 3/21/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. The response of the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they are directed.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

“said metal complexes” lacks antecedent basis.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki et al. ‘281, in view of Sato et al. ‘839.

Inagaki et al. ‘281 teach the use of compounds embraced by the formula (1), which includes linking groups such as those of formula (b) in column 3. The substituents Y may be hydrogen, alkyl groups, and halogens. (4/21-32). Benzoindoleneic terminal moieties are taught as evidenced by compounds 14 and 15 in columns 7 and 8. The use of the PF<sub>6</sub><sup>-</sup> anion is disclosed as resulting in increased stability, has good solubility and is free from the danger of explosion. (1/65-2/4). The dyes disclosed are all symmetric. The disclosure of the addition of singlet oxygen quenchers to enhance the readout durability of the medium is disclosed. Specific

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examples include transition metal complexes (9/8-12/41 and 13/33-14/28, particularly 9/8-25) useful in amounts of 0.05-12 moles/mole of cyanine dyes. (14/33-35)

Sato et al. '839 teaches the use of compounds embraced by formula (I), where the benzene nuclei may be condensed with one or more benzene rings or may be substituted by various moieties. (3/18-24) the number of methine groups is 5 when n is 2 (2/64). The anions may be any acid anions including halogens, and  $\text{SbF}_6^-$ . (2/65-67). The N-alkyl groups are different with  $\text{R}_5$  being a  $\text{C}_{1-3}$  alkyl group and  $\text{R}_6$  being a  $\text{C}_{3-18}$  alkyl group. This asymmetry is disclosed as improving the stability, solubility and the like. (4/20-30 and 2/10-15). The equivalence in the various terminal moieties is found in 3/24-25. The equivalence of heptamethine and pentamethine chains based upon the disclosure of n being equal to 2 or 3 (2/65). The equivalence in the various anions is found in 2/65-67. The addition of stabilizers, including the aminium/immonium compounds shown in column 22, and metal complexes such as biphenyldithiols and others to improve the stability of the recording medium and having compatibility with the cyanine dyes. (21/49-23/35). These may be used in amounts of 0.02- 1 mole/ mole of cyanine dyes (23/30)

It would have been obvious to one skilled in the art to modify the symmetric pentamethine benzoindolenic dye having a  $\text{PF}_6^-$  anion as the counterion, such as compounds 14 and 15 of Inagaki et al. '281 by adding a halogen as the substituent at the meso position of the pentamethine chain shown in general formula b in column 3 of Inagaki et al. '281 based upon the disclosure of equivalence within Inagaki et al. '281 and by using different N-substituents on the benzoindolenic moieties based upon the teachings of Sato et al. '839 with a reasonable expectation of achieving the increases in solubility, stability and the like as this is attributed to

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the asymmetry in the N-substituents and further it would have been obvious to one skilled in the art to use the disclosed metal complex or diimmonium stabilizers in amounts disclosed as preferred by Inagaki et al. '281 and/or Sato et al. '839 with a reasonable expectation of gaining the improvements in stability ascribed to them.

While there is not data, the solubility benefit is attributed in the Sato et al. reference to the asymmetry. Even merely being more soluble than equivalent compounds with the same N-substituents would be sufficiently desirable. The examiner notes that there is comparative data establishing improved stability. The applicant's reasons for using the hexafluorophosphoric acid anions (page 3 at lines 2-7) are the same as those taught in Inagaki et al. '281 and Saito et al. '089. The solubility disclosed by Sato et al. '839 is the same issue as discussed in the instant specification on page 9 at lines 1-7 as well as on pages 29-31 with respect to table 2. **Therefore the desired results (increased stability and solubility; increased resistance to fading of the dye due to heat or light, increased writing sensitivity and high C/N values, increased stability, has good solubility and is free from the danger of explosion) and the same means as disclosed in the instant application (different N substituents and the use of PF<sub>6</sub> as the anion) for achieving them are already appreciated in the prior art and therefore cannot be interpreted as unexpected.**

The applicant argues that the inclusion of a recitation of light stabilizers in precise amounts relative to the amount of the cyanine dye renders the claims allowable over the prior art. The applicant's arguments ignore the fact that the recited compounds are known stabilizers for cyanine dyes as detailed above and below with precise citation of the portions of the references and that the relative amounts are even known in the art. The rejection above stands.

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The examiner notes that the limitations of claims 15 and 16 are considered intended use and the use of the pentamethine cyanine dye due to its inherent absorption is held to meet this limitation. The examiner points out that a 790 nm laser is used in Sato et al. '839 (31/21). Morishima et al. '772 uses a 780 nm laser with the pentamethine dye B-16 (col. 29) in example 1 (41/65) and holds that these support his position.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Inagaki et al. does not teach all the limitation of the claims as asserted by the applicant on pages 5-8, but in combination with Sato et al., the limitations of the claims and the benefits are taught. Specifically Inagaki et al. teaches that the N substituents may be alkyl moieties and Sato et al. teaches the same, but goes further noting that when the N-alkyl moieties differ, then this asymmetry is disclosed as improving the stability, solubility and the like. This is taught for cyanine dyes, which is the same class of dyes as used by Inagaki et al and these references are both directed to optical recording media. The clear disclosure of not only benefits to the asymmetry, but the same benefits as asserted by the applicant, provides motivation to combine the teachings and gain those benefits. The response is the same for the combination of Sato et al. with other references as the motivation to combine is clear and unequivocal.

The rejection stands for the reasons above, noting that the benefits ascribed to the use of the particular substituents and the particular anions (counterions) are already recognized in the art. The benefits would be realized for the cyanine dyes irrespective of the differences in the N

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substituents. These changes do not change the chemistry involved irrespective of the applicant's arguments to the contrary. **In the most recent amendment, the applicant specifically excluded particular n-alkyl groups for R<sub>2</sub>. While the teachings of the N substituents by Sato et al. '839 is not limited to n-alkyl moieties, it may be that the use of the branched alkyl moieties (ie. iso, sec ...) glean a larger benefit than similar n-alkyl moieties, which is not appreciated in the prior art. The applicant may wish to explore this silence within the art, amend the claims to be limited to branched alkyl moieties for R<sub>2</sub> and submit declaration evidence supporting a position that these have unappreciated properties/benefits, rather than confronting what is already appreciated in the art. The closest exemplified compounds of Sato et al. '839 are compounds 5 and 10, which use dodecyl and octyl alkanes as the longer N moieties and would be expected to benefit from the teachings of Inagaki et al. '281, who uses the simpler to make symmetric dyes. Currently in the instant specification compounds of chemical formulae 2 and 7 use the n-butyl, chemical formula 3 uses the i-butyl, chemical formula 8 uses the i-pentyl, chemical formula 4 uses the n-pentyl and chemical formula 6 is similar to compound 10 of Sato et al., so the applicant may already have some data on hand for the declaration. The declaration should be commensurate in scope with the coverage sought (ie examples with meso substitution should also be present).**

5        Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al. '772, in view of Inagaki et al. '281 and/or Saito et al. '089 combined with Sato et al. '839.

          Morishima et al. '772 teaches the use of cyanine dyes embraced by the formula (B-1) in column 26, where the linking group is a pentamethine linkage optionally substituted with alkyl or halogen moieties and the Z moieties may be naphthalene residues and the N-substituents may

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be the same or different. (26/11-21). The dyes B-3, B-14 and B-10, in example 7 is a symmetric pentamethine benzoindolenic dye having a  $\text{PF}_6^-$  anion as the counterion. The use of fluorine as the anion is also disclosed. (24/66). Dyes B-24, B-25. The combination of these dyes with other dyes including nitroso and diimmonium dyes (37/57-58). The use of tetracyanoquinonodimethane stabilizers is disclosed throughout. The use of metal chelate, dimmonium salts, nitroso compounds (such as those disclosed in JP 02-300287 and 02-300288) in amounts of 1-100 parts by weight based upon 100 parts weight of the dyes. (21/53-22/12). The groups R4 and R5 may be straight, branched or cyclic alkyl groups. (24/31-33)

Saito et al. '089 teach that the use of the  $\text{PF}_6^-$  anion as the counterion increases the thermal decomposition temperature of the cyanine dye relative to the perchlorate ion. (table 3, Col. 22). This translates to increased resistance to fading of the dye due to heat or light, increased writing sensitivity and high C/N values. The use of stabilizers to improve the resistance to light fading including metal complexes such as PA 1005, 1006, and 1001, bisdithiol nickel complexes such as NKX-114 and dimmonium type compounds is disclosed. (23/54-66)

It would have been obvious to modify the dyes B-25 and B-26 of Morishima et al. '772 by using the  $\text{PF}_6^-$  anion as the counterion as taught by Inagaki et al. '281 and/or Saito et al. '089 with a reasonable expectation of improving the stability of the resultant medium with respect to heat and light based upon the teachings of Inagaki et al. '281 and/or Saito et al. '089 and using different different N-substituents on the benzoindolenic moieties based upon the teachings of Sato et al. '839 with a reasonable expectation of achieving the increases in solubility, stability and the like as this is attributed to the asymmetry in the N-substituents and and further it would have been obvious to one skilled in the art to use the disclosed metal complex ,



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tetracyanoquinodimethane, nitroso or diimmonium stabilizers in amounts disclosed as preferred by Morishima et al. '772, Sato et al. '839, Inagaki et al. '281 and/or Sato et al. '839 with a reasonable expectation of gaining the improvements in stability ascribed to them.

The rejection stands for the same reasons as above as the benefits of asymmetry in the N-substituents of cyanine dyes is clearly taught by Sato et al.

6. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morishima et al. '772, in view of Inagaki et al. '281 and/or Saito et al. '089 combined with Sato et al. '839, further in view of Ootaguro et al. '882 or Yanagisawa et al. '008.

Ootaguro et al. '882 is the US equivalent of the Japanese documents referred to in column 23 of Morishima et al. '772. (see Derwent (DWPI) abstract of the Japanese references). Nitrosophenols (11), nitrosonaphthols (13,14), nitrosoanilines (1), nitrosodiphenylamines, including 4-nitroso-4'-dimethylaminodiphenyl amine (24) in amounts of 0.01-1 mole per mole of the cyanine dyes being stabilized is disclosed. (3/19-7/49, particularly 7/36-49).

Yanagisawa et al. '008 teaches bis ([2'-chloro-3-methoxy-4-(2-methoxyethoxy)dithiobenzyl])nickel (Q-1) as being better than other metal complexes as stabilizers. These may be used in 5-50 mole% based upon the cyanine dye. (col. 4, particularly 4/50-58)

In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the combination of Morishima et al. '772 and Sato et al. '839 with Inagaki et al. '281 and/or Saito et al. '089 as set forth above by using other known stabilizers, such as those disclosed by Ootaguro et al. '882 or Yanagisawa et al. '008 as better than most metal complexes

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used in the art with a reasonable expectation of gaining the stabilizing effects attributed to these compounds.

The rejections stands for the reasons above without further comment as no arguments beyond those addressed above were presented by the applicant.

7. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki et al. '281, in view of Sato et al. '839, further in view of Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 and Dickerson et al. '447.

Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 teaches various methods for making unsymmetrical cyanine dyes including that describing the reaction of compound (II) on page 201 with quaternary salts of heterocyclic moieties having a reactive methyl group. (201-202). Pentamethine dyes disclosed as being formed in 1930 are disclosed as being meso substituted and therefore are easier to make. (page 200) These include bromo-meso and chloro-meso dyes (page 201).

Dickerson et al. '447 teaches that with pentamethine cyanine dyes, meso substitution is disclosed as promoting aggregation (12/2-8)

In addition to the basis provided above, the examiner cites Hamer, F.M., "The Cyanine Dyes and Related Compounds" (1964) pp. 200-243 and Dickerson et al. '447 to establish that the substitution of the meso position of pentamethine cyanine dyes is old and well known and that it is recognized as promoting aggregation of the dyes and holds that this further supports the obviousness of the combination of Inagaki et al. '281, in view of Sato et al. '839 discussed above.

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The rejections stands for the reasons above without further comment as no arguments beyond those addressed above were presented by the applicant.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nagano et al. JP 10-134413 and JP 04-175188 teach pentamithine cyanine dyes, bis ([2'-chloro-3-methoxy-4-(2-methoxyethoxy)dithiobenzyl])nickel and nitrosodiphenylamines.

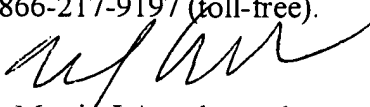
Kobayashi et al. JP 03-142281 teach various cyanine dyes and the use of branched alkyl moieties as N substituents.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

6/22/05

  
Martin J Angebrannndt  
Primary Examiner  
Art Unit 1756